Required Communication Performance (RCP)

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Agenda

- A look at some AATT applications
- The concept of RCP
  - A specification of requirements
  - A method of evaluation
  - A means to monitor
- RCP premises and parameters
- Relationships of required and achieved performance

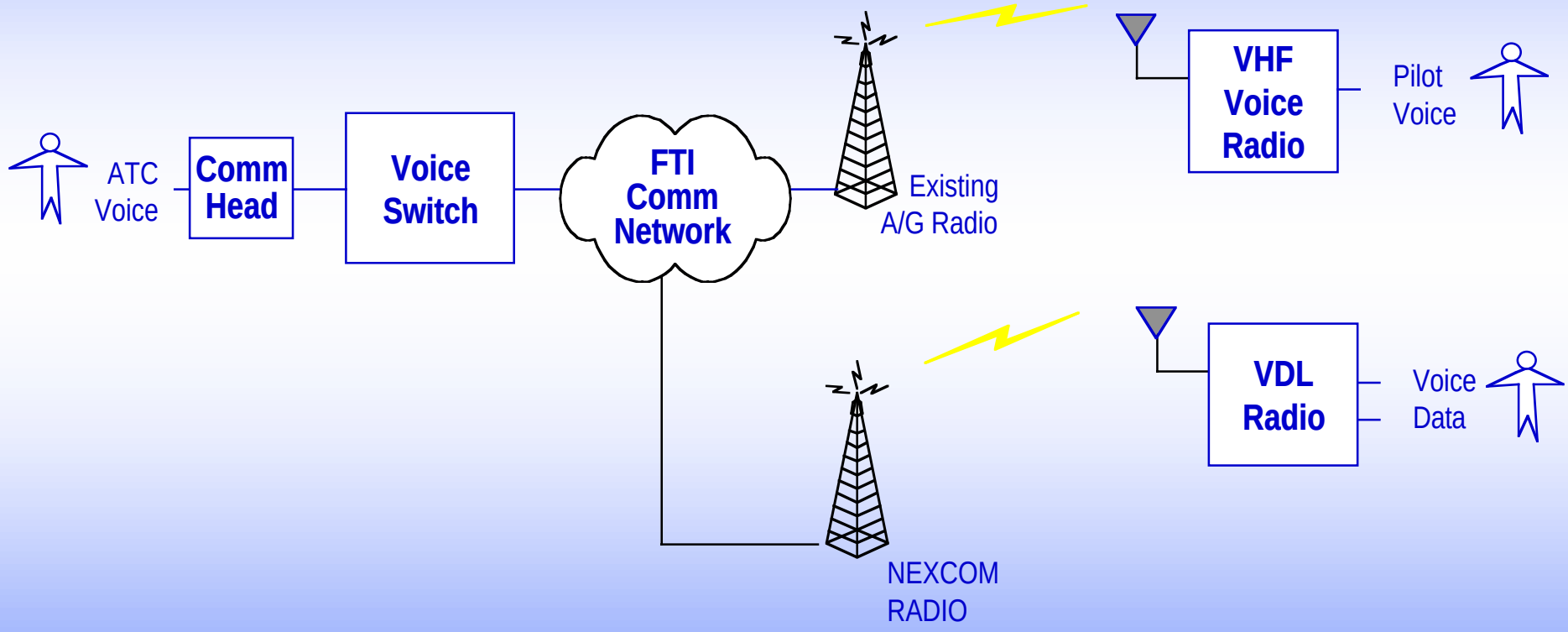
Example AATT Applications

- Note each application has highlighted the data link highlighted in yellow
- Not concerned with the actual applications
- Characterization of communication performance requirements will allow various technologies to be evaluated

2015 - CPC

Controller/Pilot Voice Communication

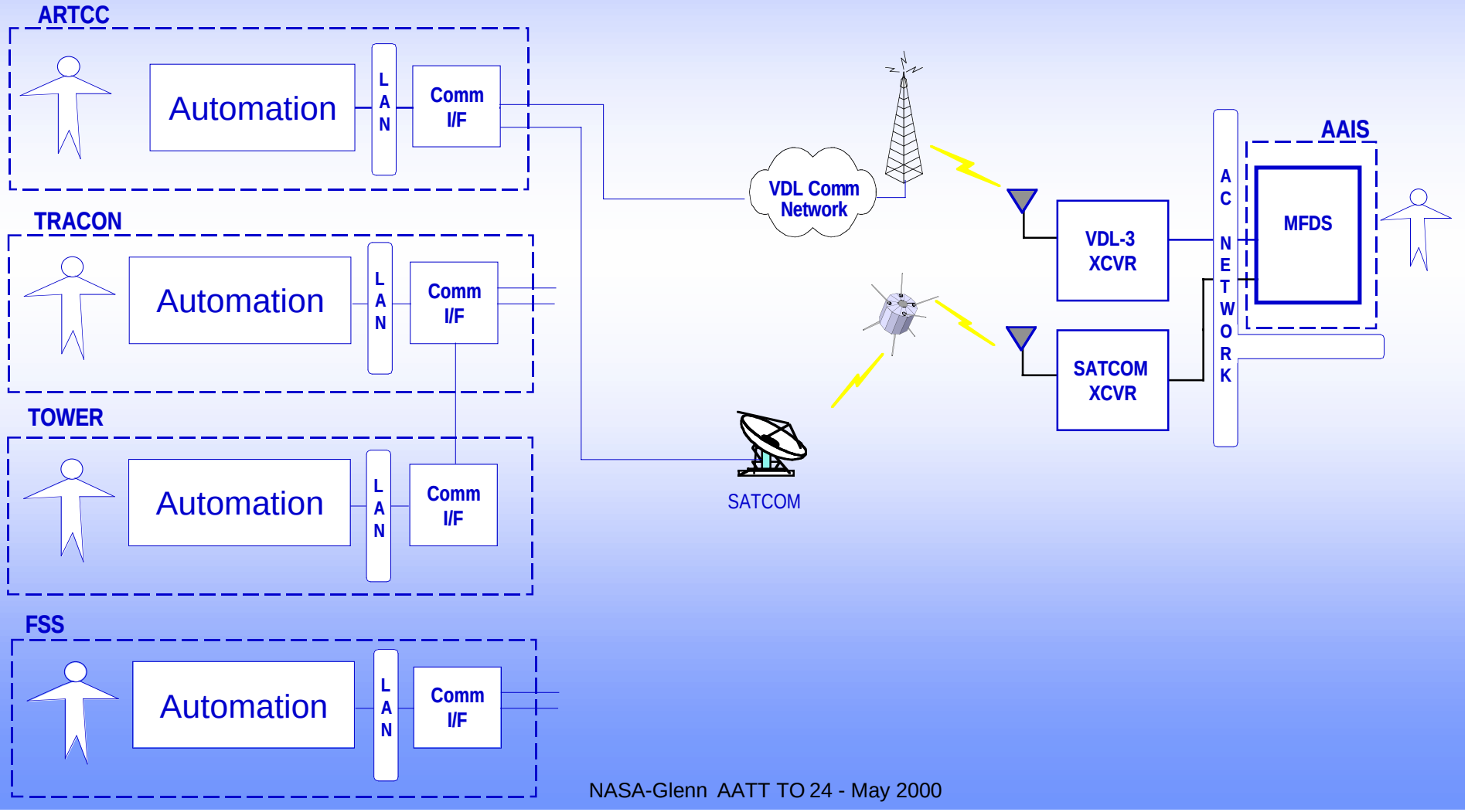
Ground Systems **Air / Ground Comm** **Aircraft**



2015 CPDLC

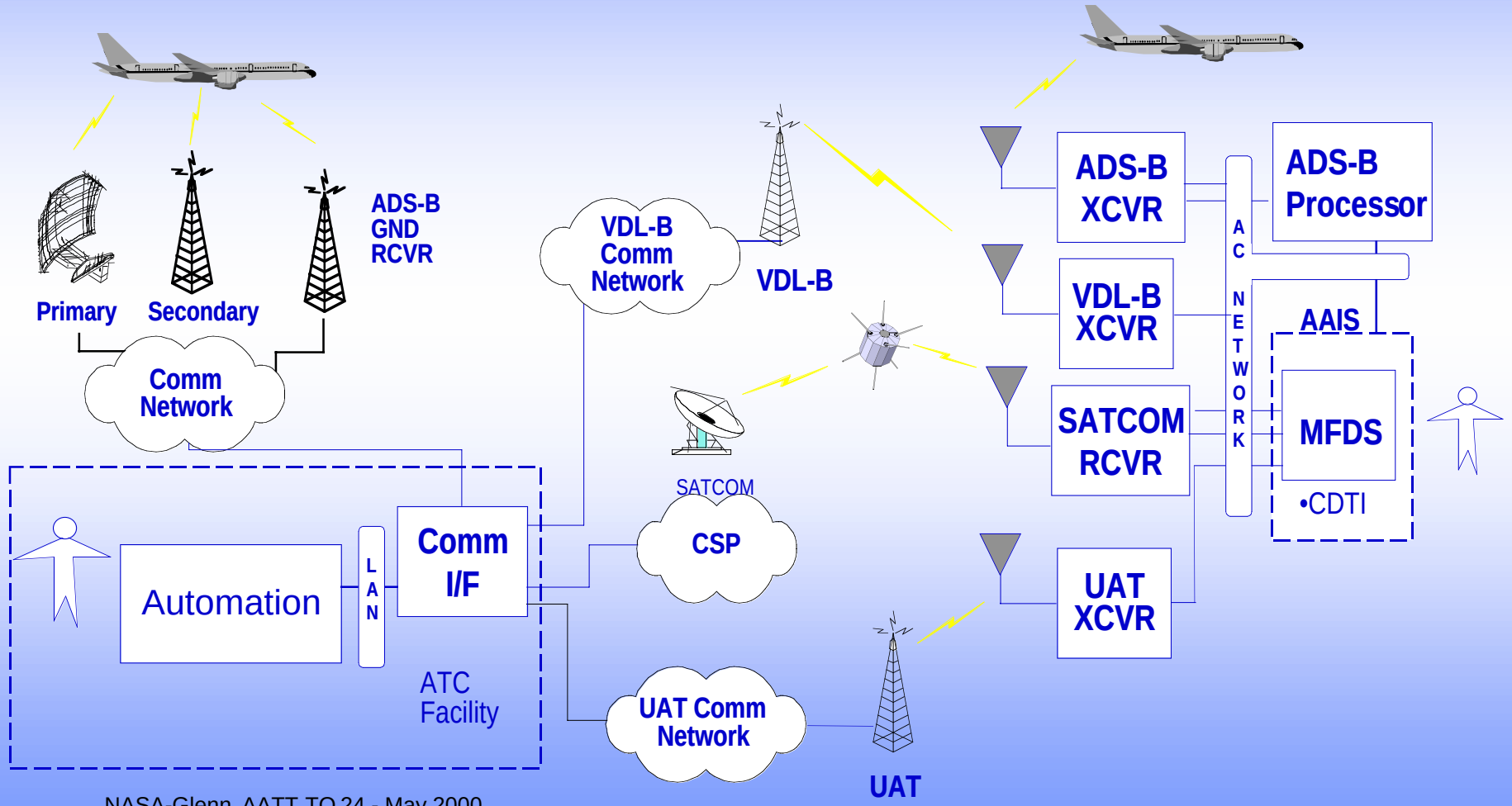
Controller / Pilot Data Link Communications

Ground Systems **Air / Ground Comm** **Aircraft**



2015 TIS
Traffic Information Services

Ground Systems Air / Ground Comm Aircraft



Basic Concept of RCP

- RCP is a statement of the communication performance necessary for a particular operation or service
- RCP is technology-independent
- RCP is defined for complete, two-way path
- Both the human and system elements are included
- RCP includes measures of
  - **Communication process time**
  - **Integrity**
  - **Availability**
  - **Continuity of Function**

Goals for RCP

- A clear and unambiguous statement of necessary level of communication performance.
- Technology independent - capable of describing requirements for voice or data
- Permits an evaluation of a particular communication technology in support of ATS applications
- In an airspace where several services are provided via data link, the characteristics of the communication infrastructure must accommodate the RCP type of the most stringent service.

RCP Concept

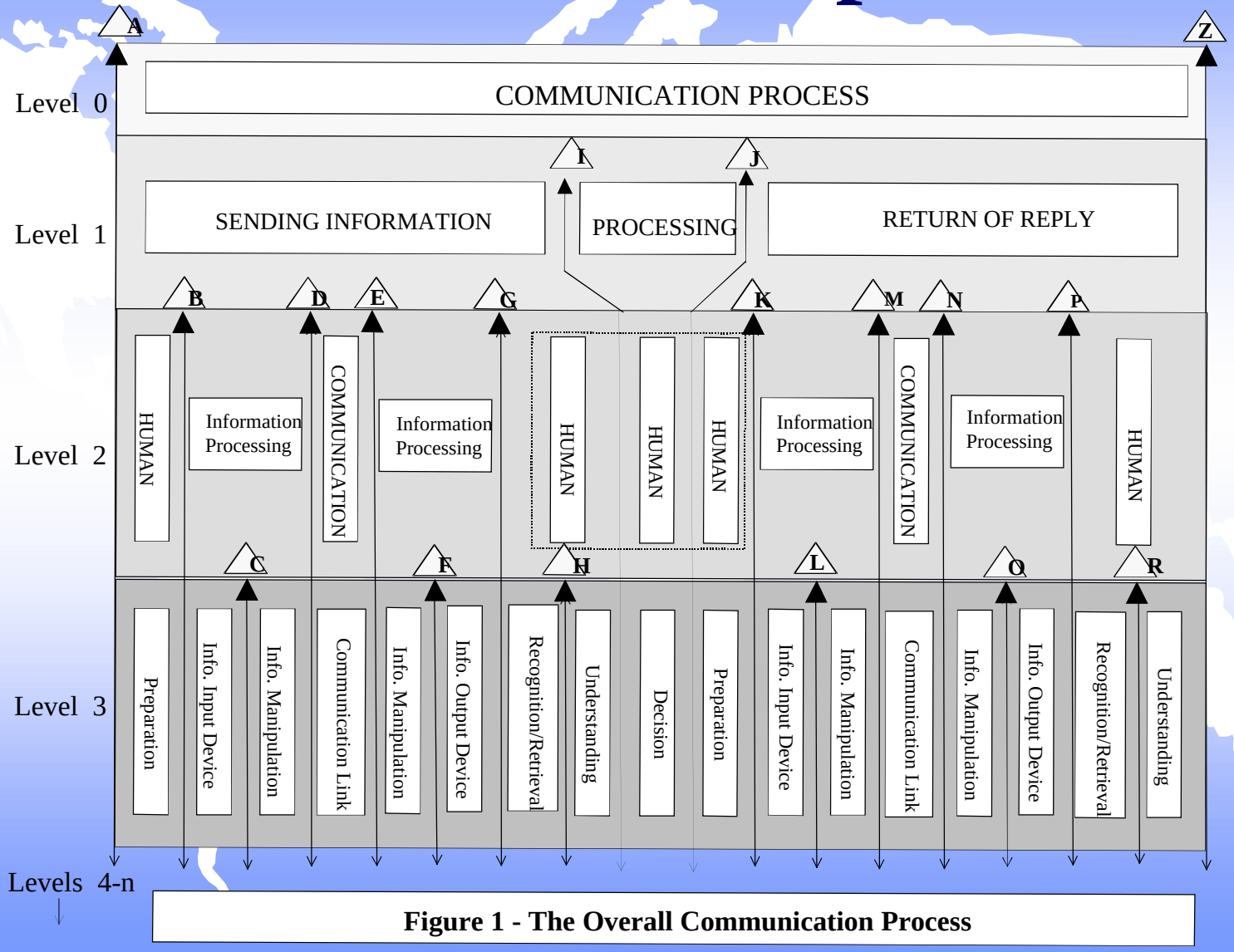
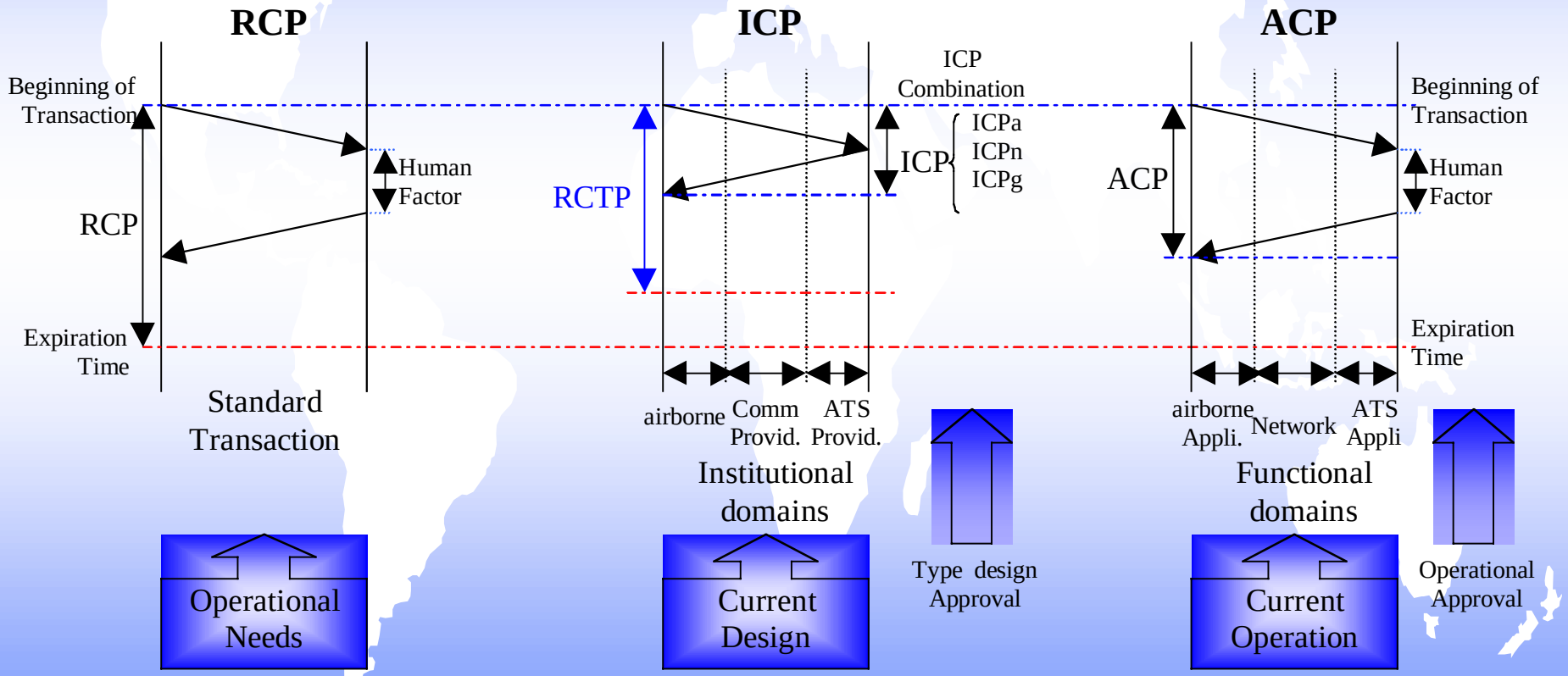


Figure 1 - The Overall Communication Process

Communication Process

- RCP covers complete communication path
- Communication path may be divided into increasingly finer elements to an arbitrary level of detail
- RCP operational concept only covers top-level

RCP, ICP, ACP


RCP
Beginning of Transaction
Human Factor
RCP
Expiration Time
Standard Transaction
Operational Needs
ICP
ICP Combination
ICPa
ICPn
ICPg
ICP
RCTP
airborne
Comm Provid.
ATS Provid.
Institutional domains
Current Design
Type design Approval
ACP
Beginning of Transaction
Human Factor
ACP
Expiration Time
airborne Appli.
Network
ATS Appli
Functional domains
Current Operation
Operational Approval

RCP, ICP, ACP
What are they?

- Required Communication Performance
  - RCP is a statement of the communication performance necessary for an aircraft to perform a given operation within a defined airspace or for a defined procedure or operation.
  - RCP states an operational need

RCP, ICP, ACP
What are they?

- Installed Communication Performance
  - A statement of the nominal technical performance of a given communication technology, excluding human performance.
  - ICP is expressed in the same terms and parameters as RCP.
  - ICP characterizes the performance of a specific design and technology
  - Used to qualify aircraft, network, ground equipment

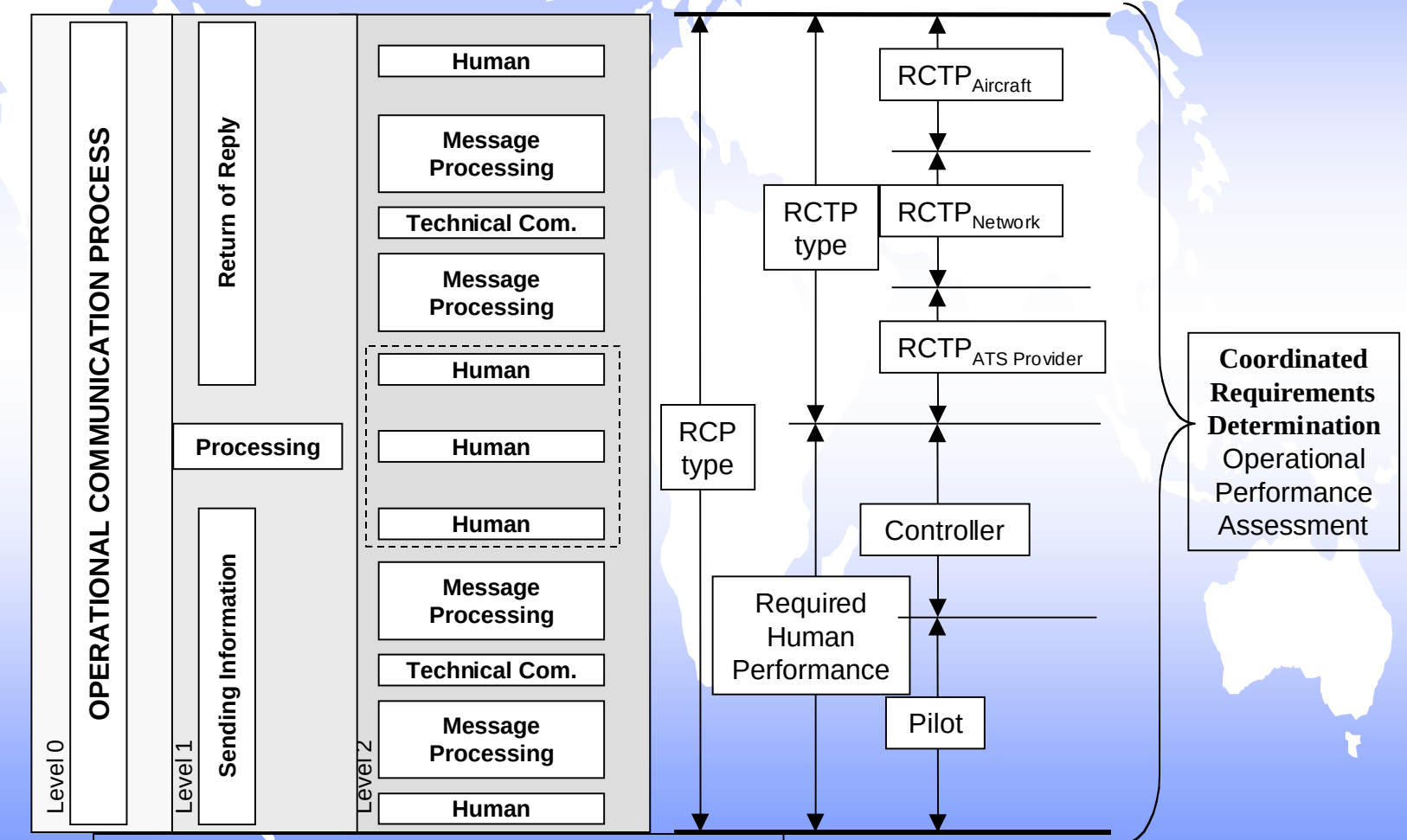
RCP, ICP, ACP
What are they?

- Achieved Communication Performance
  - An observation of the dynamic communication capability of the same round-trip path as used for RCP.
  - ACP is expressed in the same terms and parameters as RCP.
  - ACP characterizes the current performance during the operation.
  - Used for operational approvals and monitoring.

RCP Data Parameters

- Delay
  - **Round-trip delay between end users including human reaction time.**
- Availability
  - **Ratio of actual operating time to specified operating time.**
- Integrity
  - **Probability of an undetected system-induced failure of message transmission**
- Continuity of function
  - **Probability of completing an operation, given communications was available at the start.**

Comm Process Elements



Summary

- Future communications applications are being defined
- Various communications technologies are evolving
- A common 'communications requirements vocabulary' must be developed
- RCP can serve that purpose